Pls Ex. 9
(JCCX76 - Ronald G. Ehrenberg & Robert S. Smith, Modern Labor Economics: Theory and Public Policy (9th ed., 2006))

Part 2

CHAPTER 5

Frictions in the Labor Market

To this point in our analysis of the labor market, we have treated the cost of labor to employers as having two characteristics. First, we have assumed that the wage rate employers must pay is *given* to them by the market; that is, the supply of labor curve *to a firm* has been assumed to be horizontal (at the market wage). An employer cannot pay less than the going wage, because if it did so, *its workers would instantly quit and go to firms paying the going wage*. Likewise, it can acquire all the labor it wants at the market wage, so paying more would only raise its costs and reduce its ability to compete in the product market (as noted in chapter 3, only firms with product-market monopolies could pay more than they have to and still survive). Individual employers in competitive product markets, then, have been seen as wage takers (not wage makers), and their labor market decisions have involved only *how much* labor and capital to employ.

Second, we have treated all labor costs as *variable*—that is, as being strictly proportional to the length of time the employee works. Variable labor costs, such as the hourly wage rate, recur every period and, of course, can be reduced if the hours of work are reduced. By assuming that all labor costs are variable, we have in effect assumed that firms can instantaneously adjust their labor input and associated costs as market conditions change.

The purpose of this chapter is to consider how the demand for labor is affected when we assume that both workers and firms find it *costly to*

make changes to their behavior when demand or supply conditions are altered. Because higher costs of change, generally speaking, will cause workers and firms to display more resistance to change, economists borrow (loosely) a concept from physics and talk about these costs as causing labor market "frictions." In this chapter, we will analyze the implications of frictions in the labor market. That is, we will explore the implications of assuming that workers find it costly to change employers and that firms find it costly to hire or fire workers.

In the first section, we look at frictions on the *employee* side of the market, analyzing the labor market effects of employee costs when moving among employers. We will see that as the costs to workers of changing employers rise, the hiring decisions *firms* make differ from predictions of the competitive model—especially in the presence of government-mandated wages. We will also briefly investigate the implications of workers' mobility costs for the observed correlations between wages and labor market experience, tenure with one's employer, and unemployment.

In the final three sections of this chapter, we turn to an analysis of costs that *employers* bear when changing the level of employment. We will distinguish between variable labor costs, which are hourly in nature, and "quasi-fixed" costs that are associated only with the *number* of workers hired (including investments that firms make in hiring and training workers). The presence of quasi-fixed costs on the employer side of the market raises interesting questions we will address concerning firms' use of overtime, their decisions to train some workers but not others, who is laid off during business downturns, the relationship between pay and productivity, and the effects on job growth of employment-protection laws.

Frictions on the Employee Side of the Market

In this section, we first analyze a major implication of assuming employees can move among employers in a costless way and the evidence *against* this implication. We then build a model of wage and employment decisions based on the assumption that employee mobility is costly, and we explore the labor market predictions of this model.

The Law of One Price

The simple model of the labor market based on the assumption of costless employee mobility among employers has a powerful, and testable, prediction: *workers who are of equal skills within occupations will receive the same wage.*[1] This

[1]This prediction should be qualified by adding "if they are working in similar environments." As we will discuss in chapter 8, we do expect that similar workers will be paid differently if they are working in cities with different costs of living, say, or if some work in more dangerous or unpleasant settings than others.

implication is known as the "law of one price," and it rests squarely on the assumption that workers can move from employer to employer without delay and without cost. If a firm currently paying the market wage were to attempt to pay even a penny less per hour, this model assumes that it would instantly lose all its workers to firms paying the going wage. Furthermore, because an employer can obtain all the labor it wants at the going wage, none would get any advantage from paying more than the market. Thus, the market will assure that all workers with the same skill set will receive the same wages.

The problem with this prediction is that it does not seem to be supported by the facts. For example, how are we to explain that registered nurses in Albany, Madison, and Sacramento—all medium-sized state capitals with very comparable costs of living—received, on average, hourly wages of $28.87, $33.79, and $43.16 (respectively) in 2009?[2] We may also question how the market could permit the wages of payroll and timekeeping clerks in *employment services firms* to average, at $15.71 per hour, 25 percent less than their counterparts working with *furniture wholesalers*.[3]

If workers were completely mobile across employers, these geographic, inter-firm, or cross-industry wage differentials within occupations could not be maintained (unless, as we note in footnote 1, the working conditions at high-paying and low-paying firms are very different). Workers in these occupations who found themselves in low-wage firms would quit and move to the higher-wage firms, even if it meant changing the area in which they live or the industry in which they work. The fact that these wage differences are observed suggests that *worker mobility is costly* and, therefore, limited in some way.

It takes time and effort for nurses in Albany, for example, to find out that wages are higher in Sacramento—and once having found out, they will find it costly to apply, interview, move across country, and leave their friends and relatives in Albany. Similar costs will be borne by workers who may be candidates to move within the area in which they live to firms or industries paying higher wages; they must first go to the trouble of acquiring information and then bear the costs of applying and moving to a new employer.

[2]U.S. Department of Labor, Bureau of Labor Statistics, *Occupational Employment Statistics*, http://www.bls.gov/oes/current/oes_19100.htm#29-0000.

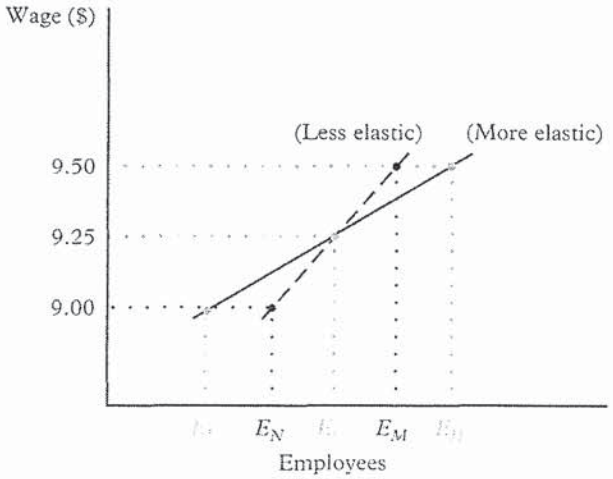
[3]U.S. Department of Labor, Bureau of Labor Statistics, *Occupational Employment Statistics*, http://www.bls.gov/oes/current/oes433051.htm. For more careful studies of intra-occupational wage differences and the law of one price, see Stephen Machin and Alan Manning, "A Test of Competitive Labor Market Theory: The Wage Structure among Care Assistants in the South of England," *Industrial and Labor Relations Review* 57 (April 2004): 371–385; V. Bhaskar, Alan Manning, and Ted To, "Oligopsony and Monopsonistic Competition in Labor Markets," *Journal of Economic Perspectives* 16 (Spring 2002): 155–174; Dale T. Mortensen, *Wage Dispersion: Why Are Similar Workers Paid Differently?* (Cambridge, Mass.: Massachusetts Institute of Technology, 2003); and Samuel Berlinski, "Wages and Contracting Out: Does the Law of One Price Hold?" *British Journal of Industrial Relations* 46 (March 2008): 59–75.

Some of these mobility costs are monetary in nature (printing résumés, buying clothes for interviewing, hiring movers), but all employment changes also involve nonmonetary costs: the expenditure of time for completing applications and interviews, giving up valued nonwage benefits on one's current job (flexible scheduling, specific job duties, employer location, opportunities to socialize with colleagues),[4] and the stress of leaving the "known" for a new place of employment. It is important to note that workers are likely to differ in how they evaluate these nonmonetary costs, so some will find moving more aggravating (costly) than others.

Assuming that worker mobility is costly has profound theoretical implications rooted in the shape of the labor supply curve to individual employers. Instead of being horizontal, as assumed earlier, *the supply of labor curve to firms becomes upward sloping when employee mobility is assumed to be costly*. Consider the relationship shown by the solid line in Figure 5.1. If Firm A is paying, say, $9.25 per hour and decides to raise its wage to $9.50, it could increase the number of workers willing to work for it from E_0 to E_H. The higher wage would attract workers from other firms whose costs of moving are relatively low, and it would reduce the chances that any of its current employees will leave; however, this wage increase is unlikely to attract *all* the other workers in the market because some would find it too costly to change employers for this modest pay increase. Likewise, if Firm A were to reduce its wage to $9.00, the number of workers it can attract might go down to E_L, as it is probable that it would lose some of its current workers but unlikely (because of mobility costs) that it would lose them all. The

Figure 5.1

The Supply of Labor to Firm A: Worker-Mobility Costs Increase the Slope of the Labor Supply Curve Facing Individual Employers



[4]For a theory of monopsonistic competition based on different preferences among employees for nonwage benefits, see V. Bhaskar and Ted To, "Minimum Wages for Ronald McDonald Monopsonies: A Theory of Monopsonistic Competition," *Economic Journal* 109 (April 1999): 190–203.

supply curve traced out by these responses to Firm A's wage changes would look like the solid line in Figure 5.1.

How would *increased* costs of mobility affect the labor supply curve facing Firm A? With higher mobility costs, wage increases would yield *smaller* increases in labor supply, and wage decreases would result in *smaller* reductions in labor supply. To fix ideas, let us return to Figure 5.1. Suppose that a wage increase to $9.50 had increased supply to the firm only to E_M and that a decrease to $9.00 would reduce labor supply only to E_N. The labor supply curve these responses would generate is shown by the dashed-line curve in Figure 5.1, which is steeper—or less elastic—than the solid one (the elasticity of a labor supply curve is defined as the percentage change in labor supplied divided by the percentage change in the wage offered).

Thus, the higher workers' mobility costs are, the steeper the labor supply curve facing a firm will tend to be. Conversely, as mobility costs fall, other things equal, the labor supply curve to firms will flatten and become more elastic. It is in the special case of zero mobility costs that the labor supply curve to individual firms becomes horizontal—and thus infinitely elastic—at the market wage. Interestingly, several recent studies of how the wage paid by a firm affects its employees' likelihood of quitting, as well as its ability to recruit new applicants, suggest labor supply elasticities to individual employers that are far from infinite in magnitude.[5]

Monopsonistic Labor Markets: A Definition

Economists describe the presence of upward-sloping labor supply curves to *individual employers* as creating *monopsonistic* conditions in the labor market. Explaining why we use this terminology takes us back to chapter 2 and the distinction between supply of labor curves to a *market* as opposed to individual firms in the market.

A labor market monopsonist is, strictly speaking, a firm that is the only buyer of labor in its labor market: a coal mine in an isolated small town in West Virginia, for example, or a pineapple plantation on a tiny Hawaiian island. In both these cases, the employer faces (as the only employer in the market) the *market* supply of labor curve, which we noted in chapter 2 is upward-sloping. For example, if a coal mine operator in an isolated town wants to expand its labor supply, it cannot simply get workers at the going wage from competing mines in the local

[5]An entire recent issue of the *Journal of Labor Economics* 28 (April 2010) was devoted to articles on monopsonistic conditions in labor markets. Especially relevant to estimates of the labor supply curve facing employers are the articles by Douglas O. Staiger, Joanne Spetz, and Ciaran S. Phibbs, "Is There Monopsony in the Labor Market? Evidence from a Natural Experiment" (pp. 211–236); Torberg Falch, "The Elasticity of Labor Supply at the Establishment Level" (pp. 237–266); and Michael R. Ransom and David P. Sims, "Estimating the Firm's Labor Supply Curve in a 'New Monopsony' Framework: Schoolteacheers in Missouri" (pp. 331–356). The introduction to the issue by Orley C. Ashenfelter, Henry Farber, and Michael R. Ransom, "Modern Models of Monopsony in Labor Markets: A Brief Survey" (pp. 203–210) provides an excellent synopsis of the papers.

area (there are none). Instead, it will have to increase wages to (a) attract miners who must move in from out of town; (b) attract workers from other occupations whose preferences were such that, at the old, lower mining wage, they preferred to work at a job that was less dangerous or dusty; or (c) induce people currently out of the labor force to seek paid employment.

In chapter 3, we first developed the labor demand curve under the twin assumptions that both product and labor markets were competitive. Toward the end of the chapter, we briefly analyzed how *product-market* monopolies (only one *seller* of a product) affect the demand for labor, but we deferred the analysis of conditions under which the *labor market* is not competitive. We now return to our analysis of labor demand and consider the implications when the labor market is not completely competitive—that is, when mobility costs impede workers' entry to, and exit from, various places of employment. We call such labor markets *monopsonistic*.

Before proceeding, however, we must emphasize that when we describe a labor market as monopsonistic, we are not thinking exclusively of the rather rare case of pure monopsony (single employers in isolated places). Indeed, our analysis of monopsonistic labor markets rests *only* on the assumption that *the labor supply curves facing individual employers slope upward* (and are not horizontal). In this analysis, it does not matter *why* these curves slope upward! Being the only employer in town is clearly one cause, but in the prior section, we argued that these curves slope upward because employees find it costly to change jobs—even when there are several potential employers for them in their labor market. Thus, despite the term *monopsonistic*, the analysis that follows applies to labor markets that have many employers in them.

Profit Maximization under Monopsonistic Conditions

Recall from chapter 3 that profit-maximizing firms will hire labor as long as an added worker's marginal revenue product is greater than his or her marginal expense. Hiring will stop when marginal revenue product equals marginal expense. When it is assumed that extra workers can be attracted to the firm at the going wage rate (that is, when labor supply curves to firms are horizontal), then the marginal expense is simply equal to the wage rate. When firms face upward-sloping labor supply curves, however, the marginal expense of hiring labor *exceeds* the wage. Our purpose now is to analyze how both wages and employment are affected when the marginal expense of labor exceeds the wage rate.

Why the Marginal Expense of Labor Exceeds the Wage Rate We start by considering why an upward-sloping labor supply curve causes the marginal expense of labor to exceed the wage rate. To see this, take the hypothetical example of a start-up firm that must attract employees from other employers. Its potential employees find it costly to change jobs, and for some, the costs are higher than for others. Therefore, the start-up firm faces an upward-sloping labor supply schedule like that represented in Table 5.1. If the firm wants to operate with 10 employees, it

Table 5.1

Labor Supply Schedule for a Hypothetical Firm Operating in a Monopsonistic Market

Offered Wage ($)	Supply of Labor	Total Hourly Labor Cost ($)	Marginal Expense of Labor ($)
8	10	80	
9	11	99	19
10	12	120	21
11	13	143	23

would have to pay $8 per hour, but if it wants to attract 11 employees, it must pay $9—and if it wants 12 workers, it must pay $10 per hour.

Simple multiplication indicates that its hourly labor costs with 10 employees would be $80, but with 11 employees, it would be $99; thus, the *marginal* expense of adding the eleventh worker is $19. If the firm were to operate with 12 workers instead of 11, its hourly costs would rise from $99 to $120, for a marginal expense equal to $21. One can immediately see that the marginal expenses of $19 and $21 are far greater than the wages paid (of $10 and $11).

Why is the marginal expense in this case so much greater than the wage? In moving from 10 to 11 workers, for example, the firm would have to pay one dollar more per hour to each of the 10 it originally planned to hire and then pay $9 to the added worker—for a total of $19 in extra costs. The marginal expense, then, includes the wages paid to the extra worker (as was the case in chapter 3) plus the additional cost of raising the wage for all other workers.[6]

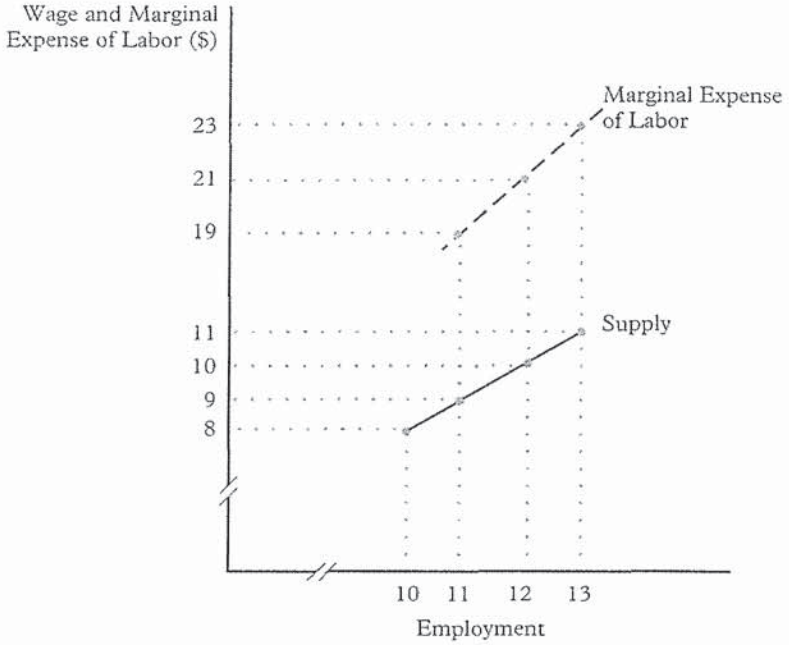
The hypothetical data in Table 5.1 are graphed in Figure 5.2. The (solid) supply curve in Figure 5.2 indicates, of course, the number of employees attracted to the firm at each wage level. In short, it represents, for the firm in question, the *wage it must pay* to get to each of the employment levels it is considering. The dashed line represents the *marginal expense*—the added cost of increasing the employment level by one worker. The marginal expense curve both *lies above* the supply curve and is *steeper in slope* (that is, goes up at a faster rate).[7]

[6]We are assuming here that the firm plans to offer its prospective workers the same wage and does not have the ability to find out which of its applicants would work for less. For a fuller discussion of this issue, with some empirical results that support this assumption, see Alan Manning, *Monopsony in Motion: Imperfect Competition in Labor Markets* (Princeton, N.J.: Princeton University Press, 2003), chapter 5.

[7]In the hypothetical example outlined in Table 5.1 and Figure 5.2, the slope of the supply curve is 1; to obtain one more worker, the firm must raise its wage by $1. The slope of the marginal expense curve, however, is 2 (in going from 11 to 12 workers, for example, the marginal expense rises from $19 to $21). In general, it is easy to show (if one knows a bit of calculus) that if the supply curve to a firm is a straight line, the marginal expense curve associated with that supply curve will have a slope that is *twice as steep*.

Figure 5.2

A Graph of the Firm-Level Data in Table 5.1



The Firm's Choice of Wage and Employment Levels What are the labor market effects caused by having the marginal expense of labor lie above the wage rate? To maximize profits, we know that any firm—including those in monopsonistic markets—should hire labor until the point at which the marginal revenue product of labor (MRP_L) equals labor's marginal expense (ME_L):

$$MRP_L = ME_L \tag{5.1}$$

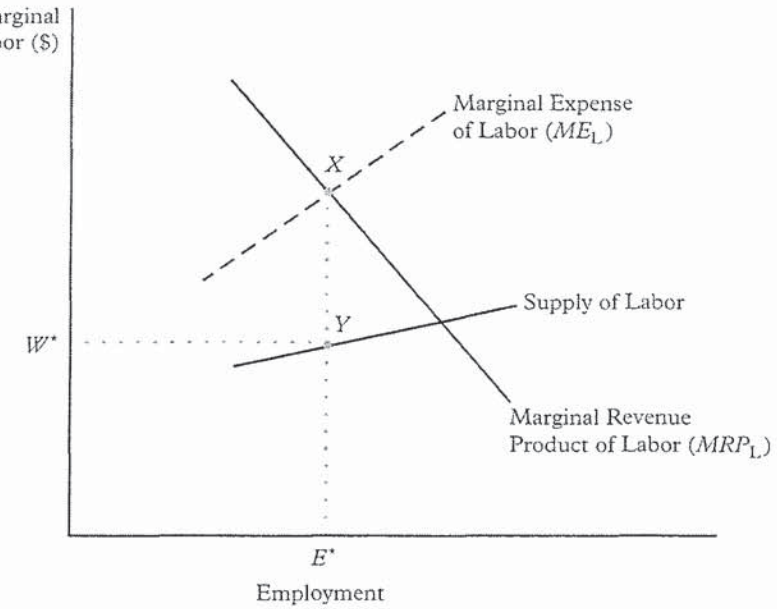
To illustrate the effects of having ME_L exceed the wage (W), we turn to Figure 5.3, which displays, for a given employer, its labor supply curve, the associated marginal expense of labor curve, and the downward-sloping curve depicting the firm's MRP_L.

Any firm in a monopsonistic labor market must make two decisions about hiring. First, like firms in competitive labor markets, it must decide *how much labor to hire*. This decision, consistent with the profit-maximizing criterion in equation (5.1), is made by finding the employment level at which $MRP_L = ME_L$. In Figure 5.3, the profit-maximizing level of employment for the firm shown is E^* because it is at E^* that $MRP_L = ME_L$ (note the intersection of the relevant curves at point X).

Second, the firm must find the *wage rate necessary* to generate E^* employees. In Figure 5.3, the wage rate that will attract E^* workers is W^* (note point Y on the labor supply curve). The firm's labor supply curve represents the relationship between its potential wage rates and the number of workers interested in working

Figure 5.3

Profit-Maximizing Employment and Wage Levels in a Firm Facing a Monopsonistic Labor Market



there. Thus, this second decision (about wages) is shown graphically by reading from the labor supply curve the wage needed to attract the profit-maximizing number of workers.

Monopsonistic Conditions and Firms' Wage Policies A difference between competitive and monopsonistic labor markets that immediately stands out concerns the wage policies of employers. With a competitive labor market, where individual firms are wage takers and can hire all the labor they want at the going wage, employers decide only on the number of workers they want to hire; the wage they pay is given to them by the market. We have seen, however, that firms facing monopsonistic conditions have a second decision to make: they must decide on the wage to pay as well. Further, while firms in competitive labor markets hire until the MRP_L equals the (given) wage, firms in monopsonized markets pay workers a wage less than their marginal revenue product.

The implication that firms in monopsonistic labor markets must have their own wage policies does not suggest, of course, that they set wages without constraints. We saw in the model depicted in Figure 5.3 that the wages they pay are determined both by their MRP_L curve and the labor supply curve they face, and in our simple model, both curves were given to the firm and thus were outside its control. Furthermore (and not illustrated by the figure), firms must make labor market decisions that allow them to remain competitive in their product markets. Thus, monopsonistic conditions do not give firms a completely free hand in deciding on their wages; they must still face constraints imposed by both labor and product markets.

Within the product and labor market constraints facing them, however, different firms in monopsonistic labor markets may well offer different wages to equivalent workers. It is unlikely that the labor supply and MRP_L curves would be exactly the same for different firms in the same labor market; thus, we should not be surprised if exactly comparable workers were to have different marginal productivities and receive different wages at different firms. Thus, a firm employing older equipment and having a lower MRP_L could coexist with one having new equipment and a higher MRP_L by paying a lower wage to the same kind of worker. Indeed, a careful summary of studies on wage differences and the law of one price found strong evidence suggesting that the same worker would receive different pay if he or she worked for different employers.[8]

How Do Monopsonistic Firms Respond to Shifts in the Supply Curve?

In a monopsonistic labor market, the firm does not really have a labor demand curve! Labor demand curves for a firm are essentially derived from sequentially asking, "If the market wage were at some level (say, $5), what would be the firm's profit-maximizing level of employment? If, instead, the wage were $6, what would be the firm's desired level of employment?" Under monopsonistic conditions, the firm is not a wage taker, so asking hypothetical questions about the level of wages facing the firm is meaningless. Given the firm's labor supply curve and its schedule of marginal revenue product (MRP_L at various levels of employment), there is only one profit-maximizing level of employment and only one associated wage rate, both of which are chosen by the firm.

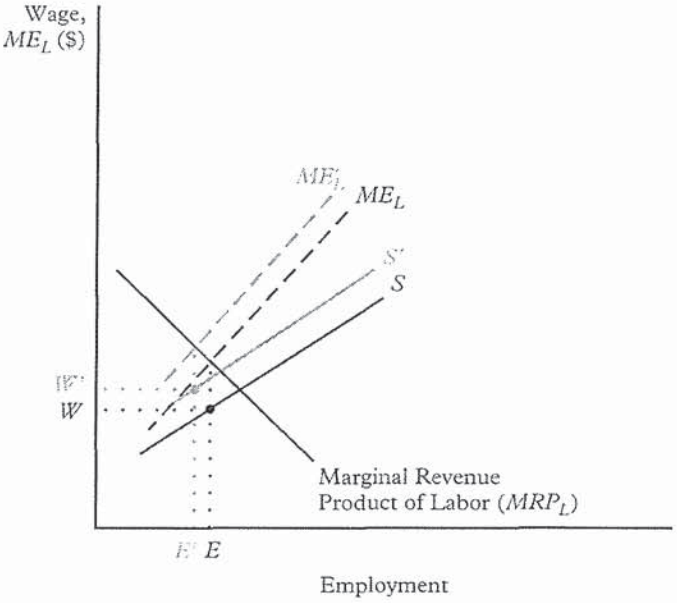
Shifts in Labor Supply That Increase ME_L Consider the short-run and long-run effects on a monopsonistic firm's desired level of employment if the supply curve facing the firm shifts (but remains upward-sloping). Suppose, for example, that the labor supply curve were to shift to the left, reflecting a situation in which fewer people are willing to work at any given wage level. With the competitive model of labor demand, a leftward shift of a market supply curve would cause the market wage to increase and the level of employment to fall, as employers moved to the left along their labor demand curves. Will these changes in wages and employment occur under monopsonistic conditions?

In Figure 5.4, the MRP_L curve is fixed (we are in the short run), and the leftward shift of the labor supply curve is represented by a movement to curve S' from the original curve S. With a supply curve of S, the firm's marginal expense of labor curve was ME_L, and it chose to hire E workers and pay them a wage of W. When the supply curve shifts to S', the firm's marginal labor expenses shift to a higher curve ME'_L. Therefore, its new profit-maximizing level of employment falls to E', and its new wage rate increases to W'. Thus, with a monopsonistic

[8] See Mortensen, *Wage Dispersion*, chapter 1.

Figure 5.4

The Monopsonistic Firm's Short-Run Response to a Leftward Shift in Labor Supply: Employment Falls and Wage Increases



model (just as with the competitive model), a leftward shift in labor supply increases ME_L, raises wages, and reduces firms' desired levels of employment in the short run.

In the long run, labor's increased marginal expense will induce the substitution of capital for labor as firms seek to find the cost-minimizing mix of capital and labor. You will recall that the cost-minimizing conditions for capital and labor under *competitive* conditions were given in equation (3.8c), in which the wage rate was treated as the marginal expense of labor. In a monopsonistic labor market, ME_L exceeds W, so the left-hand side of equation (3.8c) must be written in its general form:

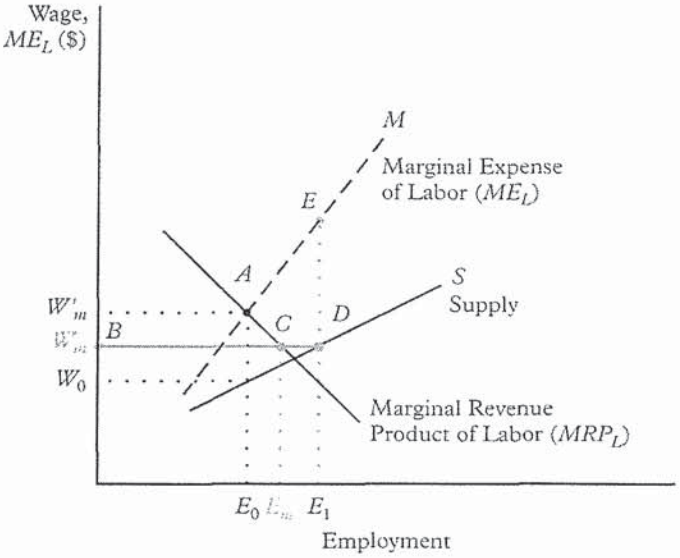
$$ME_L/MP_L = C/MP_K \tag{5.2}$$

Clearly, if a monopsonist is minimizing its costs of production and its ME_L is increased, it will want to restore equality to condition (5.2) by substituting capital for labor. Thus, employment decreases even more in the long run than in the short run.

Effects of a Mandated Wage Let us next consider what would happen if some nonmarket force were to compel the firm to pay a particular wage rate that was higher than the one it was paying. Would the firm's desired level of employment decline? For a monopsonistic firm's short-run response, refer to Figure 5.5, where the firm initially equates MRP_L and ME_L at point A and chooses to hire E_0 workers, which requires it to pay a wage of W_0.

Figure 5.5

Minimum-Wage Effects under Monopsonistic Conditions: Both Wages and Employment Can Increase in the Short Run



Suppose now that a mandated wage of W_m is set in Figure 5.5. This mandate prevents the firm from paying a wage less than W_m and effectively creates a horizontal portion (BD) in the labor supply curve facing the firm (which is now BDS). The firm's marginal expense of labor curve is now $BDEM$, because up to employment level E_1, the marginal expense of labor is equal to W_m. The firm, which maximizes profits by equating marginal revenue with marginal expense (this equality is now at point C), will hire E_m workers. Even though wages have risen from W_0 to W_m, desired employment rises from E_0 to E_m!

For a monopsonistic firm, then, a mandated wage can simultaneously increase the *average* cost of labor (that is, the wages paid to workers) and reduce ME_L. It is the decrease in *marginal* expense that induces the firm to expand output and employment in the short run. Thus, because an upward-sloping supply curve is converted to one that is horizontal, at least for employment near the current level, it is possible that both wages and employment can increase with the imposition of a mandated wage on a monopsonistic firm. This possibility is subject to two qualifications, however.

First, in the context of Figure 5.5, employment will increase only if the mandated wage is set between W_0 and W'_m. A mandated wage above W'_m would increase ME_L above its current level (W'_m) and cause the profit-maximizing level of employment to fall below E_0. (The student can verify this by drawing a horizontal line from any point above W'_m on the vertical axis and noting that it will intersect the MRP_L curve to the left of E_0.)

Second, Figure 5.5, with its fixed MRP_L curve, depicts only the short-run response to a mandated wage. In the long run, two (opposing) effects on employment

are possible. With a mandated wage that is *not too high*, a monopsonistic firm's ME_L is reduced, causing a substitution of labor for capital in the long run. While the monopsonistic firm's *marginal* expense of labor may have fallen, however, labor's *average* cost (the wage) has increased. It is now more expensive to produce the same level of output than before; thus, profits will decline. If it is in a competitive product market, a firm's initial profit level will be normal for that market, so the decline will push its profits below normal. Some owners will get out of the market, putting downward pressure on employment. If this latter (scale) effect is large enough, employment in monopsonistic sectors could fall in the long run if a mandated wage were imposed.

In summary, then, the presence of monopsonistic conditions in the labor market introduces uncertainty into how employment will respond to the imposition of a mandated wage *if* the new wage reduces the firm's marginal expense of labor. Any shift in the supply of labor curve that *increases* the marginal expense of labor, of course, will unambiguously reduce employment.

Monopsonistic Conditions and the Employment Response to Minimum Wage Legislation

At the end of chapter 4, we argued that the estimated responses of employment to increases in the legislated minimum wage presented something of a puzzle. Not all credible empirical studies demonstrate the employment loss predicted by the presence of downward-sloping labor demand curves, and many that do find employment loss tend to show losses that are smaller than we would expect, given the estimates of labor demand elasticities in Table 4.1. Can the presence of monopsonistic conditions in the labor market offer a potential explanation for these findings?

We saw in the previous section that if the labor market is monopsonistic, legislated increases in the minimum wage raise wages but—if modest enough in size—can reduce the marginal expense of labor. Thus, our expectations about the direction of employment changes caused by a higher minimum wage are ambiguous: some firms might experience increases in employment (because ME_L falls), but others might be forced to close because higher total labor costs render their operations nonprofitable.

Our discussion in the previous section might also help explain why the labor demand elasticities presented in Table 4.1 tend to be larger (more elastic) than those implied by many studies of employment responses to minimum-wage changes. The elasticities presented in Table 4.1 were estimated from wage and employment outcomes that were generated by market forces. Graphically, these estimates were derived from analyses like the one presented in Figure 5.4, where a leftward shift in the supply curve unambiguously caused wages to rise and employment to fall. Increases in the minimum wage cause a very different set of responses, as we saw when comparing Figures 5.4 and 5.5. If monopsonistic conditions exist, then theory leads us to expect that employment responses to wage

changes generated by *market* forces might be different from employment responses to *legislated* wage increases.

Is it credible to assert that monopsonistic conditions might be what underlie the small or uncertain direction of employment changes we find in minimum wage studies? Most of these studies focus on teenagers, and one might think that teenagers could move almost without cost from one part-time job to another. If mobility is virtually costless for teenagers, they would freely move among employers in response to small wage differentials, the teenage labor market would correspond closely to the competitive model, and we would have to look elsewhere for an explanation of the uncertain estimated effects of minimum wages on teenage employment.

We have argued that mobility is hindered (made more costly) by imperfect information about alternative wage offers and job requirements, by the time and aggravation of applying and being evaluated, and by the necessity of giving up valued nonwage job characteristics that might be difficult to replace in the new job. Teenagers, as well as adults, face these categories of cost. Moreover, teenagers often take jobs with the intent of staying only a short time, and they may perceive the total gains from going to a higher-paying employer as too small to justify the investment of time and effort needed to change employers. Thus, it is not inconceivable that the supply curves to firms that typically employ teenagers (fast-food outlets, for example) are upward-sloping and that monopsonistic conditions prevail even in these places.

Job Search Costs and Other Labor Market Outcomes

The presence of job mobility costs for workers means that they must make decisions about when to search for a new employer (and incur the costs of search) and when to stay put. These decisions about search have some interesting implications that can help explain why wages rise with both labor market experience and the length of time (tenure) with a particular employer. Other reasons for why wages rise with experience and tenure will be discussed later in the text; however, our current discussion of job search costs warrants attention to these implications here. We will also discuss how job search costs affect decisions by those who are unemployed.

Wage Levels, Luck, and Search We have seen that employee mobility costs can create monopsonistic conditions that result in pay differences among workers who have equal productive capabilities. Monopsonistic conditions, however, are not the sole cause of wage differences for workers who appear to be similar. Indeed, we will spend much time later in this text analyzing wage differences associated with job or worker characteristics that are often not easily measured or observed: different working conditions (chapter 8), different on-the-job training requirements or opportunities (chapter 9), and different ways to use pay in creating incentives for productivity (chapter 11). In addition, we will also analyze

wage differences related to racial, ethnic, or gender differences that may be unrelated to productive characteristics (chapter 12).

What the theory of monopsonistic labor markets offers to the analysis of wage differences, however, is the implication that to some extent, a worker's wage depends on luck. Some workers will be fortunate enough to obtain a job offer from a high-paying employer, and some will not. Furthermore, given the costs of changing employers, the mobility from low-wage to high-wage firms may never be great or rapid enough to bring wages into equality.

When workers who may think they can get improved job offers face costs in searching for employers, we are naturally drawn to thinking about an employee–employer "matching" process that occurs over a period that may be lengthy. Workers can be viewed as wanting to obtain the best match possible but finding that there is a cost to getting better matches. Those who see their jobs as a poor match (perhaps because of low pay) have more incentives to search for other offers than do workers who are lucky enough to already have good matches (high wages). Over time, as the unlucky workers have more opportunity to acquire offers, matches for them should improve—but, of course, at some wage levels, likely wage increases from a search are so small (or, given the worker's expected stay on the job, so short-lived) that further search is not worth the cost.

Labor-market studies have observed that workers' wages tend to increase both with (1) overall labor market experience *and*, (2) holding labor market experience constant, the length of time with one's employer ("job tenure").[9] Job search considerations may play a role in producing these patterns, and we will briefly discuss them here.

Wages and Labor Market Experience One of the things that make job search costly is that it takes time and effort to obtain job offers. Furthermore, job openings occur more or less randomly over time, so that during any one period in which a worker is "in the market," not all potentially attractive openings even exist. As time passes, however, jobs open up and workers have a chance to decide whether to apply. Those who have spent more time in the labor market have had more chances to acquire better offers and thus improve upon their initial job matches. While other explanations are explored in chapter 9, the costs of job search offer one explanation for why we observe that, in general, *workers' wages improve the longer they are active in the labor market.*

Wages and Job Tenure With costly job searches, workers who are fortunate enough to find jobs with high-paying employers will have little incentive to continue searching, while those who are less fortunate will want to search again. This means that the workers who have been with their firms the longest will tend to be the ones who got higher wages to begin with, and we should therefore observe a positive correlation between tenure and earnings. Indeed, as noted

[9]Manning, *Monopsony in Motion*, chapter 6.

above, empirical studies also find that among workers with the same skills and labor market experience, *those who have longer job tenure with their employers also tend to have higher wages*. While there are other potential explanations for this relationship as well (see chapters 9 and 11), the presence of costly job search suggests that it may not simply be longer tenures that cause higher wages; rather, higher wages can also cause longer job tenures!

Job Search Costs and Unemployment Job search costs can also help to explain the existence (and level) of unemployment. While we analyze unemployment in chapter 14, the relationship between search costs and the phenomenon of unemployment is important to introduce at this point. Briefly put, searching for job offers is something that the unemployed must do, and the search process will take time and effort. The longer it takes for a worker to receive an acceptable offer, the longer the unemployed worker will remain unemployed. Thus, higher job search costs will tend to lengthen the spells of unemployment and hence increase the unemployment rate.[10]

Monopsonistic Conditions and the Relevance of the Competitive Model

If employee mobility costs mean that monopsonistic conditions exist in the typical labor market, does this imply that the competitive model is irrelevant or misleading? While we have seen that the competitive model does indeed offer predictions that are at least partially contradicted by the evidence, it is difficult to believe that it is irrelevant, especially in the long run.

The major difference between the competitive and monopsonistic models, of course, is the assumption about employee mobility costs. When we consider workers as a group, however, mobility costs are likely to be higher in the near term than over the long haul. It is relatively costly, for example, for a registered nurse with a family established in Albany to move herself and her family to Sacramento. Likewise, an established payroll clerk working with an employment agency may find it aggravating or time-consuming to search for, and then move to, a similar job in the furniture industry. It is much less costly, however, for a recent graduate or immigrant who is trying to decide where in the country to locate, or in which industry to work, to "move among" job offers. Recent graduates or immigrants have to search and make a decision anyway (established workers often do not), and when choosing among offers, they have much less to give up in terms of established relationships by taking one offer over the other. As time passes, those established in jobs retire and are replaced by new workers who see the advantages of locating in certain areas or accepting work in certain industries; thus, over time, we would expect wage differences owing to luck to dissipate—even if mobility costs are present in the short term. One study, for example, found

[10]See Manning, *Monopsony in Motion*, chapter 9, for a discussion of job search and unemployment.

that new immigrants to the United States are more likely to be clustered in states offering the highest wages for their skill groups and that their presence has helped to narrow regional wage differences.[11]

It is also the case that, monopsonistic conditions notwithstanding, employers cannot deviate too far from the market when setting wages, for if they do, they will encounter problems in attracting, retaining, and motivating their workers (a topic to which we will return in chapter 11). Nobel laureate Paul Samuelson put the issue this way in his bestselling economics textbook:

> Just because competition is not 100 per cent perfect does not mean that it must be zero. The world is a blend of (1) competition and (2) some degree of monopoly power over the wage to be paid. A firm that tries to set its wage too low will soon learn this. At first, nothing much need happen; but eventually, it will find its workers quitting a little more rapidly than would otherwise be the case. Recruitment of new people of the same quality will get harder and harder, and slackening off in the performance and productivity of those who remain on the job will become noticeable.[12]

Frictions on the Employer Side of the Market

Employers also face frictions in searching for and hiring employees. These frictions cause firms to bear costs that are associated with the number of workers hired rather than the hours they work, and they are called "quasi-fixed" costs because they are either difficult or impossible to cut in the short run—unlike variable costs (such as hourly wages), which can be readily cut by reducing the hours of work. The presence of quasi-fixed costs slows the adjustment of employment levels to changing market conditions faced by firms. The types of quasi-fixed costs are first discussed in this section, and we then move to an analysis of their implications for the labor market behavior of firms.

Categories of Quasi-Fixed Costs

Employers often incur substantial quasi-fixed costs in hiring and compensating their employees. In general, these costs fall into two categories: *investments* in their workforce and certain *employee benefits*. We discuss each type of quasi-fixed costs below.

Labor Investments When an employer has a job vacancy, it must incur certain costs in finding a suitable employee to hire. It has to advertise the position, screen applications, interview potential candidates, and (in the case of highly sought

[11]George Borjas, "Does Immigration Grease the Wheels of the Labor Market?" *Brookings Papers on Economic Activity* (2001): 69–119.

[12]Paul A. Samuelson, *Economics: An Introductory Analysis* (New York: McGraw-Hill, 1951): 554.

EXAMPLE 5.1

Does Employment Protection Legislation Protect Workers?

Many European countries have adopted employment protection policies that make it more costly for employers to dismiss employees. These policies contain provisions for determining when dismissal is "unjustified" or "unfair," and some (as in Greece) go so far as saying that neither lack of business nor lack of competence is a justifiable reason for dismissal. While many countries have policies that do not go that far—requiring only that firms attempt to transfer or retrain candidates for dismissal—the severance pay required when dismissals are considered "unjust" is frequently in the range of 8 to 12 months of pay.

Procedural inconveniences to employers, such as the need to notify or obtain the approval of third parties (labor unions, for example) and the rights of employees to challenge dismissal in a legal setting, are also part of these laws; additional procedures and delays are imposed on employers wanting to make collective layoffs. Finally, these policies also regulate and restrict the use of temporary employees or employees on fixed-length contracts, because use of these employees is seen as a way around the goal of employment protection.

A study that rated the strictness of each country's employment-protection laws found that those with the strictest laws did indeed have lower movements of workers from employment into unemployment. That is, stronger employment protection policies do reduce layoffs. However, the stronger these policies are, the slower is the flow *out* of unemployment, because the costs of these policies also inhibit employers from creating new jobs. While the reduced flows both into and out of unemployment tend to have offsetting effects on the overall unemployment rate, the study did find that stricter employment protection is associated with more *long-term* unemployment and *lower employment levels for women and youth.*

Source: OECD Employment Outlook: 2004 (Paris: Organisation for Economic Co-operation and Development, 2004), chapter 2; and Lawrence M. Kahn, "The Impact of Employment Protection Mandates on Demographic Temporary Employment Patterns: International Microeconomic Evidence," *Economic Journal* 117 (June 2007): F333–F356.

applicants) "wine and dine" the worker selected. A 1982 survey, for example, which was weighted toward employers hiring less-skilled workers, found that even for these vacancies, almost 22 person-hours were spent screening and interviewing applicants.[13] Once hired, there are the additional costs of orienting the new worker and getting him or her on the payroll.

A hiring cost not to be overlooked—especially because it has been the subject of public policy debates—is the cost of *terminating* the worker. Every employee a firm hires might also have to be let go if economic circumstances or job performance require it. As we discuss in Example 5.1, policies that require severance pay or otherwise increase the costs of *ending* the employment relationship thus add to the quasi-fixed costs of *hiring* workers.

[13]See John Bishop, "Improving Job Matches in the U.S. Labor Market," *Brookings Papers on Economic Activity: Microeconomics* (1993): 379.

Table 5.2

Hours Devoted by Firms to Training a New Worker during First Three Months on Job, 1992

Activity	Average Hours
Hours of formal instruction by training personnel	19
Hours spent by management in orientation, informal training, extra supervision	59
Hours spent by coworkers in informal training	34
Hours spent by new worker watching others do work	41
Total	153

Source: John Bishop, "The Incidence of and Payoff to Employer Training," Cornell University Center for Advanced Human Resource Studies Working Paper 94–17, July 1994, 11.

In addition to the hiring costs, firms typically provide formal or informal training to both their new and continuing workers. The costs of this training generally fall into three classes:

1. The *explicit* monetary costs of formally employing trainers and providing training materials.
2. The *implicit*, or opportunity, costs of lost production incurred when experienced employees take time to demonstrate procedures to trainees in less-formal settings.
3. The *implicit*, or opportunity, costs of the trainee's time.

A survey in the early 1990s found that in the first three months (or 520 hours of work) an employee is with a firm, about 30 percent (153 hours) of his or her time is spent in training. The data from this study, summarized in Table 5.2, also suggest that very little of this training was formal classroom-type instruction; most took place informally at the workstation.[14]

Hiring and training costs can be categorized as *investments* because they are incurred in the present and have benefits (in the form of increased productivity) only in the future. Investments are inherently risky because, once made, the costs are "sunk," and there are no guarantees about future returns. We will analyze the effects of these investments on employer behavior later in this chapter.

Employee Benefits Besides their direct wage and salary earnings, workers also typically receive nonwage compensation in the form of employer-provided medical and life insurance, retirement plans, vacation days, Social Security payments, and other *employee benefits*. Table 5.3 details the employee benefits received by workers in 2010, and it is important to note that many of these benefits represent

[14]For other studies and related references, see Harley Frazis, Maury Gittleman, and Mary Joyce, "Correlates of Training: An Analysis Using Both Employer and Employee Characteristics," *Industrial and Labor Relations Review* 53 (April 2000): 443–462.

Table 5.3

Employee Benefits as a Percentage of Total Compensation, 2010 (Average Hourly Cost in Parentheses)

Legally required payments	**7.7**	**($2.30)**
Social Security	5.6	($1.68)
Workers' compensation	1.5	($0.44)
[a]Unemployment insurance and other	0.6	($0.18)
Retirement	**4.5**	**($1.32)**
[a]Employment costs based on benefit formulas (defined benefit plans)	2.7	($0.81)
Employer costs proportional to earnings (defined contribution plans)	1.7	($0.51)
[a]**Insurance** (medical, life)	**8.8**	**($2.62)**
[a]**Paid vacations, holidays, sick leave**	**6.9**	**($2.06)**
Other	**2.5**	**($0.73)**
Total	**30.4**	**($9.04)**

[a]Category of costs believed by authors to be largely quasi-fixed (see discussion in the text).

Source: U.S. Labor Department, Bureau of Labor Statistics, "Employer Costs for Employee Compensation—March 2010," Table 1, news release USDL: 10-0774 (June 9, 2010).

quasi-fixed costs to the employer. That is, many employee benefits are associated with the number of employees but not with the hours they work.

Most life and medical insurance policies have premiums to the employer that are charged on a per-worker basis and are not proportional to the hours worked. Pay for time not worked (vacation, holidays, and sick leave) also tends to be quasi-fixed. Some pension costs are proportional to hours worked because many employers offer *defined contribution* plans and make payments to a retirement fund for each worker that are proportional to wage or salary earnings. However, some employers have *defined benefit* pension plans that promise pension payments to retirees that are a function of years of service, not hours of work; the costs of these plans are thus quasi-fixed in nature.

In the category of legally required benefits, workers' compensation insurance costs are strictly proportional to hours worked, because they are levied as a percentage of payroll, and Social Security taxes are proportional for most employees.[15] However, the unemployment insurance payroll-tax liability is specified to be a percentage (the tax rate) of each employee's yearly earnings up to a maximum level (the taxable wage base), which in 2010 was between $7,000 and $15,000 in over two-thirds of all states.[16] Since most employees earn more than $15,000 per

[15]The Social Security payroll-tax liability of employers is specified as a percentage of each employee's earnings up to a maximum taxable wage base. In 2010, this tax was 6.20 percent of earnings up to $106,800 for retirement and disability insurance and 1.45 percent on all earnings for Medicare. Because the maximum earnings base exceeded the annual earnings of most workers, the employer's payroll tax liability is increased when a typical employee works an additional hour per week.

[16]U.S. Department of Labor, Employment and Training Administration, *Comparison of State Unemployment Insurance Laws 2010* (Washington, D.C.: U.S. Government Printing Office, 2010), Table 2-1.

year, having an employee work an additional hour per week will *not* cause any increase in the employer's payroll-tax liability. Therefore, unemployment insurance costs are a quasi-fixed cost to most employers.

In Table 5.3, we have indicated (by a superscript *a*) which nonwage costs are usually of a quasi-fixed nature. The data suggest that around 19 percent of total compensation (about 60 percent of nonwage costs) is quasi-fixed. These quasi-fixed costs averaged, on a yearly basis, over $10,600 per worker in 2010. The quasi-fixed nature of many nonwage labor costs has important effects on employer hiring and overtime decisions. These effects are discussed in the following section.

The Employment/Hours Trade-Off

The simple model of the demand for labor presented in the preceding chapters spoke to the quantity of labor demanded, making no distinction between the number of individuals employed by a firm and the average length of its employees' workweek. Holding all other inputs constant, however, a firm can produce a given level of output with various combinations of the number of employees hired and the number of hours worked per week. Presumably, increases in the number of employees hired will allow for shorter workweeks, whereas longer workweeks will allow for fewer employees, other things equal.

In chapter 3, we defined the marginal product of labor (MP_L) as the change in output generated by an added unit of labor, holding capital constant. Once we distinguish between the *number* of workers hired (which we will denote by M) and the *hours* each works on average (H), we must think of two marginal products of labor. MP_M is the added output associated with an added worker, holding both capital and average hours per worker constant. MP_H is the added output generated by increasing average hours per worker, holding capital and the number of employees constant. As with MP_L, we assume that both MP_M and MP_H are positive but that they decline as M and H (respectively) increase.[17]

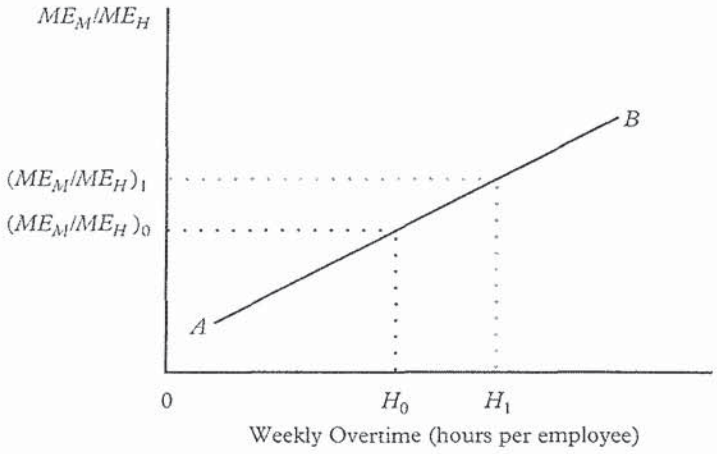
How does a firm determine its optimal employment/hours combination? Is it ever rational for a firm to work its existing employees overtime on a regularly scheduled basis, even though it must pay them a wage premium, rather than hiring additional employees?

Determining the Mix of Workers and Hours The fact that certain labor costs are not hours-related, while others are, will lead employers to think of "workers" and "hours-per-worker" as two substitutable labor inputs. Thus, the profit-maximizing employer will weigh the cost of producing an added unit of output by hiring

[17]When the number of employees is increased, the decline in MP_M may be due to the reduced quantity of capital now available to each individual employee. When the hours each employee works per week are increased, the decline in MP_H may occur because after some point, fatigue sets in.

Figure 5.6

The Predicted Relationship between ME_M/ME_H and Overtime Hours



more workers against the cost of producing an added unit of output by employing its current workers for more hours. Recalling our discussion of equation 3.8c, profit maximization can only be achieved when these two costs are equal. Thus, if the marginal expense of hiring an added worker is ME_M, and the marginal expense of hiring current workers for an extra hour is ME_H, then for profits to be maximized, the following condition must hold:

$$\frac{ME_M}{MP_M} = \frac{ME_H}{MP_H} \tag{5.3}$$

The left-hand side of equation (5.3) is the cost of an added unit of output produced by hiring more workers, and the right-hand side is the cost of an added unit of output produced by hiring workers for more hours.

One implication of equation (5.3) is that if for some reason ME_M rises relative to ME_H, firms will want to substitute hours for workers by hiring fewer employees but having each work more hours. (An alternative to hiring more workers or increasing hours is to "rent" workers; see Example 5.2.) Conversely, if ME_H rises relative to ME_M, the employer will want to produce its profit-maximizing level of output with a higher ratio of workers to average hours per worker. The relationship between ME_M/ME_H and hours of work is graphed in Figure 5.6, which indicates that as ME_M rises relative to ME_H, other things equal, hours of work per employee tend to rise.

Policy Analysis: The Overtime Pay Premium In the United States, the Fair Labor Standards Act requires that employees covered by the act (generally, hourly paid, nonsupervisory workers) receive an overtime pay premium of at least 50 percent of their regular hourly wage for each hour worked in excess of 40 per week. Many overtime hours are worked because of unusual circumstances that

EXAMPLE 5.2

"Renting" Workers as a Way of Coping with Hiring Costs

One indication that the quasi-fixed costs of hiring are substantial can be seen in the growth of temporary-help agencies. Temporary-help agencies specialize in recruiting workers who are then put to work in client firms that need temporary workers. The temporary-help agency bills its clients, and its hourly charges are generally above the wage the client would pay if it hired workers directly—a premium the client is willing to pay because it is spared the investment costs associated with hiring. Because obtaining jobs through the temporary-help agency also saves employees repeated investment costs associated with searching and applying for available temporary openings, its employees are willing to take a wage less than they otherwise would receive. The difference between what its clients are charged and what its employees are paid permits the successful temporary-help agency to cover its recruiting and assignment costs.

How anxious are firms and workers to avoid the costs of search and hiring? Some 2 million workers were employed by temporary-help services in 1995, and growth in this industry has been so rapid that it accounted for one-fourth of all employment growth in the United States during the mid-1990s.

Data from: Lewis M. Segal and Daniel G. Sullivan, "The Growth of Temporary Services Work," *Journal of Economic Perspectives* 11 (Spring 1997): 117–136.

are difficult or impossible to meet by hiring more workers: rush orders, absent workers, and mechanical failures are all examples of these emergency situations. However, some overtime is regularly scheduled; for example, over 20 percent of men who are skilled craft workers or technicians usually work more than 44 hours per week.[18]

Given the "time-and-one-half" premium that must be paid for overtime work, we can conclude that employers who regularly schedule overtime do so because it is cheaper than incurring the quasi-fixed costs of employing more workers. Indeed, the production workers most likely to work long hours on a regular basis are those for which hiring and training costs are higher. For example, while over 20 percent of male craft workers are scheduled for more than 44 hours each week, only 12 percent of unskilled males usually work more than 44 hours.[19]

In the fall of 2004, the U.S. Department of Labor introduced several controversial revisions to federal overtime regulations that redefined which jobs are exempt from coverage. Generally speaking, for a job to be exempt from the requirements of overtime pay, the employee must be paid on a salaried basis (not by the hour) and perform administrative, professional, or executive duties. The regulations introduced in 2004 disallowed exemptions for low-paying salaried

[18]Daniel Hecker, "How Hours of Work Affect Occupational Earnings," *Monthly Labor Review* 121 (October 1998): 8–18.

[19]Dora L. Costa, "Hours of Work and the Fair Labor Standards Act: A Study of Retail and Wholesale Trade, 1938–1950," *Industrial and Labor Relations Review* 53 (July 2000): 648–664, references empirical work on the use of overtime. Also see Hecker, "How Hours of Work Affect Occupational Earnings," 10.

jobs (paying less than $455 per week), regardless of duties—thus adding overtime coverage to an estimated 1.3 million workers. The new regulations, however, revised the definitions of "administrative," "professional," and "executive" duties and added many computer and outside sales jobs to the list of those exempt from overtime regulations. Also made exempt were jobs in which total pay exceeds $100,000 per year.[20]

These revisions created a storm of public comment and criticism. While they were lauded for giving "greater protection" to low-paid hourly employment, the revisions were also criticized for making it easier to exempt jobs, thus "making it likely that millions of [workers] will work longer hours at reduced pay."[21] We will briefly analyze these two claims using economic theory.

Overtime and Spreading the Work It is often argued that the time-and-one-half requirement for overtime protects workers by "spreading the work" (creating more job openings) through reduced usage of overtime. One reason to be cautious in our expectations that increased coverage will create more jobs is that applying the overtime premium increases the average cost of labor even if a firm *eliminates* its prior use of overtime! Firms using overtime before *could* have increased their workforce and reduced the use of overtime earlier; the fact that they did not suggests that the quasi-fixed costs of hiring made that a more costly option. If they now eliminate overtime and hire more workers at the same base wage rate, their labor costs will clearly rise. Increased labor costs will tend to reduce both the scale of output and increase firms' incentives to substitute capital for labor, thereby reducing the total labor hours demanded by affected firms. Thus, even if base wages are not changed, it is unlikely that all the reduced overtime hours will be replaced by hiring more workers.

Overtime and Total Pay Will newly covered workers experience an increase in earnings, and will those in newly exempt jobs experience an earnings decrease as a result of the revisions? It is possible that they will not, because the base wage rate may change in response to changes in overtime coverage.

We have seen that many overtime hours are regularly scheduled, and in these cases, it is possible that employers and employees mutually agree (informally, at least) on a "package" of weekly hours and total compensation. If so, firms that regularly schedule overtime hours might respond to a legislated increase in coverage by reducing the straight-time salary in a way that, after taking the newly required overtime payments into account, would leave total compensation per worker unchanged. Similarly, employees who lose coverage under overtime laws

[20]U.S. Department of Labor, Wage and Hour Division, "Defining and Delimiting the Exemptions for Executive, Administrative, Professional, Outside Sales and Computer Employees: Economic Report," *Federal Register* 69, no. 79, part 2 (April 23, 2004): 22191.

[21]Ross Eisenbrey and Jared Bernstein, "Eliminating the Right to Overtime Pay: Department of Labor Proposal Means Lower Pay, Longer Hours for Millions of Workers," *Economic Policy Institute Briefing Paper* (June 26, 2003): 1.

and are asked to work more hours may be unwilling to stay in those jobs—unless, of course, their pay is increased accordingly.

Thus, the long-run effects of overtime regulations on the total earnings of workers may not be as profound as supporters imply. A recent study of wages in Great Britain, where there is no national overtime pay regulation, found that average hourly earnings after accounting for overtime pay were fairly uniform across firms in given industries. Put differently, in firms that paid above-average overtime premiums, straight-time (base) wages were below average—and firms that paid above-average base wages paid below-average overtime premiums.[22] A study of the effects of overtime premiums in the United States also found evidence that base wages adjust to mandated changes in these premiums in a way that suggests employers and employees regard hours and pay as a package; this study found that legislated expansions in overtime coverage have had no measurable effect on overtime hours worked.[23]

Training Investments

We have identified employer-provided training as an important investment that can increase the quasi-fixed costs of hiring workers. The costs of training, even if provided by the employer, are often at least partly paid by workers themselves in one way or another, so training investments represent a rather unique friction in the labor market. This section explores the implications of this friction for both employer behavior and employee behavior.

The Training Decision by Employers

Consider an employer who has just hired a new employee. If the employer decides to bear the cost of training this worker, it will incur the explicit and implicit training costs discussed earlier—including, of course, the forgone output of the worker being trained. Thus, in the training period, the employer is likely to be bearing costs on behalf of this new worker that are greater than the worker's marginal revenue product. Under what conditions would an employer be willing to undertake this kind of investment?

As with any investment, an employer that bears net costs during the training period would only do so if it believes that it can collect returns on that investment *after training*. It is the prospect of increased employee productivity that motivates an employer to offer training, but the only way the employer can make a return on its investment is to "keep" some of that added post-training revenue by not giving all of it to the worker in the form of a wage increase.

[22]David N. F. Bell and Robert A. Hart, "Wages, Hours, and Overtime Premia: Evidence from the British Labor Market," *Industrial and Labor Relations Review* 56 (April 2003): 470–480.

[23]Stephen J. Trejo, "Does the Statutory Overtime Premium Discourage Long Workweeks?" *Industrial and Labor Relations Review* 56 (April 2003): 530–551.

Put succinctly, for a firm to invest in training, two conditions must be met. First, the training that employees receive must increase their marginal revenue productivity more than it increases their wage. Second, the employees must stay with the employer long enough for the employer to receive the required returns (obviously, the longer the employees stay with the firm, other things equal, the more profitable the investment will be).

The Types of Training

At the extremes, there are two types of training that employers can provide. *General training* teaches workers skills that can be used to enhance their productivity with many employers; learning how to speak English, use a word-processing program, drive a truck, or create Web sites are examples of general training. At the other end of the spectrum is *specific training*, which teaches workers skills that increase their productivity only with the employer providing the training. Examples of specific training include teaching workers how to use a machine unique to their workplace or orienting them to particular procedures and people they will need to deal with in various circumstances they will encounter at work.

General Training Paying for general training can be a rather risky investment for an employer, for if the employer tries to keep post-training wage increases below increases in marginal revenue productivity, trained workers might leave. Because general training raises productivity with other employers too, trained workers have incentives to look for higher wage offers from employers that have no training costs to recoup!

Thus, if employee mobility costs are not very great, employers will be deterred from investing in general training. The likelihood of making back their required returns is low, because the gap between marginal revenue product and the post-training wage might not be sufficiently great, or the expected tenure of the trained workers with the firms sufficiently long, to recoup their investment costs. When worker-mobility costs are low, firms either would not provide the training or would require the employees to pay for it by offering a very low (or, in the case of some interns, a zero) wage rate during the training period.

Only if employees are deterred from quitting by high mobility costs does our theory suggest that firms would invest in general training. Recent work suggests that firms often *do* invest in general training for their workers, and these investments are cited as yet another reason for believing that the labor market is characterized by monopsonistic conditions.[24]

[24]Daron Acemoglu and Jörn-Steffen Pischke, "Beyond Becker: Training in Imperfect Labour Markets," *Economic Journal* 109 (February 1999): F112–F142; Mark A. Loewenstein and James R. Spletzer, "General and Specific Training: Evidence and Implications," *Journal of Human Resources* 34 (Fall 1999): 710–733; Laurie J. Bassi and Jens Ludwig, "School-to-Work Programs in the United States: A Multi-Firm Case Study of Training, Benefits, and Costs," *Industrial and Labor Relations Review* 53 (January 2000): 219–239; and Edwin Leuven, Hessel Oosterbeek, Randolph Sloof, and Chris van Klaveren, "Worker Reciprocity and Employer Investment in Training," *Economica* 72 (February 2005): 137–149.

Specific Training Employers have stronger incentives to invest in specific training, because such training does not raise the worker's productivity with other firms, and it therefore does not make the worker more attractive to competing employers. While the training itself does not increase the outside offers an employee might be able to receive, a firm undertaking investments in specific training must nevertheless take precautions to keep the trained employee from quitting, because once the employee quits, the employer's investment is destroyed (that is, returns on the investment cannot be realized). Thus, concerns about the possibility that trained employees will quit before the employer can receive its required investment returns exist relative to specific, as well as general, training. These concerns lead us to a discussion of (a) who bears the costs of training and (b) the size of post-training wage increases.

Training and Post-Training Wage Increases

Consider a situation in which worker-mobility costs are relatively low, and the *employer* is considering bearing all the costs of training. With investment costs to recoup, the employer would be unable to raise wages very much after training and still have incentives to invest. We know that higher wages reduce the probability of a worker quitting, so by failing to increase the wage much after training, the employer would put its investment at risk. Trained workers might decide to quit at even a small provocation (the boss is in a bad mood one day, for example, or they are asked to work overtime for a while), and without some assurance that trained employees will stay, the firm would be reluctant to make a training investment for which it bore all the costs.

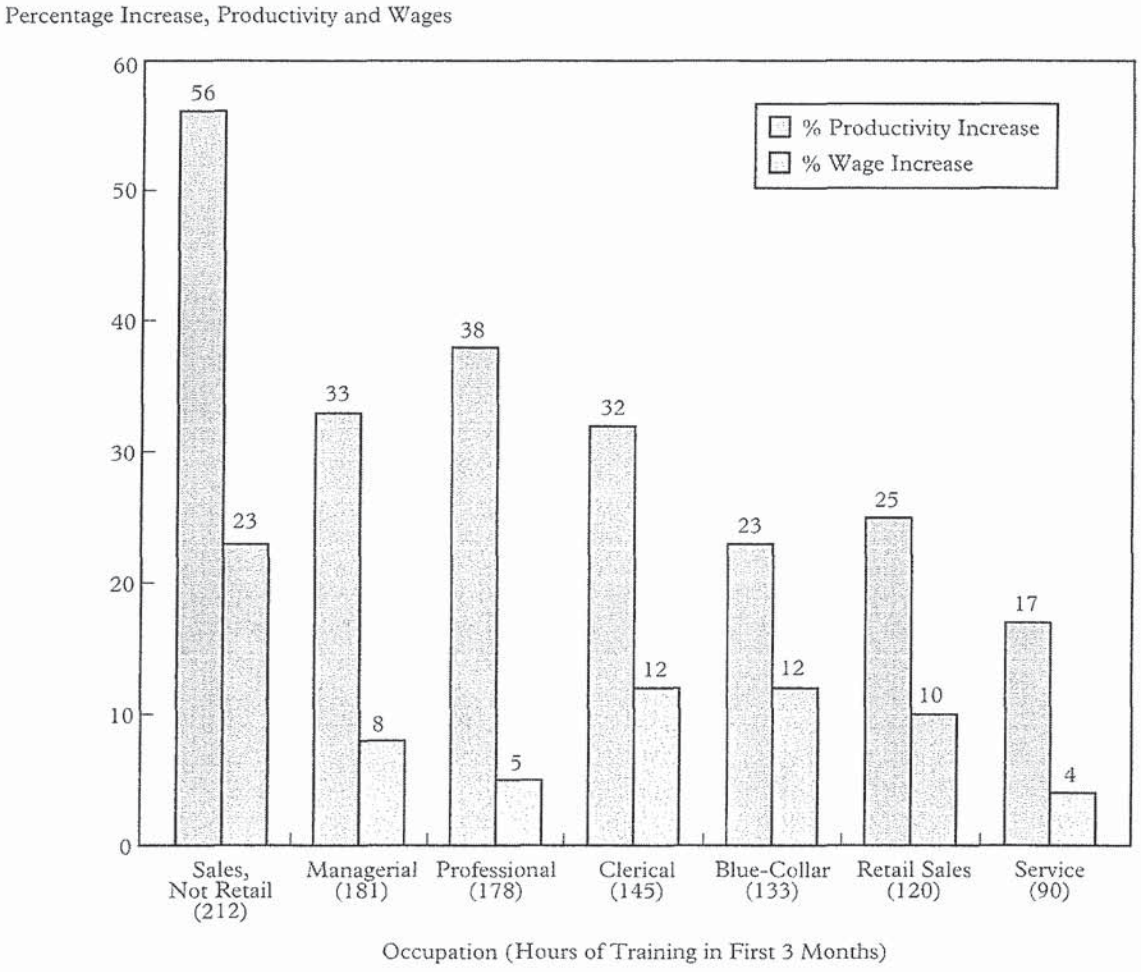
Conversely, if a firm's *employees* paid for their own training by taking a lower wage than they could get elsewhere during the training period, they would require the benefits of a much higher post-training wage to make employment at the firm attractive. If they were to get all of their improved marginal revenue product in the form of a wage increase, however, an employer that finds it relatively inexpensive to hire and fire workers would have little to lose by firing *them* at the smallest provocation—and if they get fired, *their* investment is destroyed!

Thus, if labor market frictions are otherwise small, the best way to provide incentives for on-the-job training is for employers and employees to *share* the costs and returns of the investment. If *employees* pay part of these costs, the post-training wage can be increased more than if employers bear all the training costs—and the increased post-training wage protects *firms'* investments by reducing the chances trained workers will quit. The training costs borne by *employers* must be recouped by not raising the post-training wage very much, but this condition helps protect *workers'* investments by making it attractive for firms to retain them unless the provocation is major (we discuss the issue of layoffs in more detail a bit later in this chapter). Put differently, if both employers and employees share in the costs of training, and thus share in the returns, they both have something to lose if the employment relationship is ended in the post-training period.

Empirical studies measuring the wage profiles associated with on-the-job training in the United States, however, suggest that *employers bear much of the costs*

Figure 5.7

Productivity and Wage Growth, First Two Years on Job, by Occupation and Initial Hours of Employer Training



Source: John Bishop, "The Incidence of and Payoff to Employer Training," Cornell University Center for Advanced Human Resource Studies, working paper 94-17, July 1994, Table 1.

and reap most of the returns associated with training. Wages apparently are not depressed enough during the training period to offset the employer's direct costs of training, so subsequent wages increases are much smaller than productivity increases.[25] A survey of employers, summarized in Figure 5.7, estimated that

[25]John Bishop, "The Incidence of and Payoff to Employer Training," Cornell University Center for Advanced Human Resource Studies Working Paper 94–17, July 1994; and Margaret Stevens, "An Investment Model for the Supply of General Training by Employers," *Economic Journal* 104 (May 1994): 556–570.

productivity increases, which generally rose with the hours of initial on-the-job training, were far larger than wage increases over a worker's first two years with an employer. Other studies that directly link the wage profiles of American workers with the amount of training they have received find that post-training wage increases are relatively modest.[26]

The evidence that employers bear much of the training costs, and reap much of the returns, suggests that these employers believe their workers face relatively high worker-mobility costs. These firms are willing to bear the investment costs because they do not feel the need to raise the post-training wage much in order to retain their trained employees.

Employer Training Investments and Recessionary Layoffs

We have seen that employers will have incentives to invest in worker training only when the post-training marginal revenue productivity is expected to be sufficiently above the wage so that the investment returns are attractive. Suppose a firm has made the investment but at some point thereafter finds that its workers' marginal revenue productivity falls below what it expected because of a business downturn (a "recession"). If it cannot lower wages for one reason or another (we will discuss why wages might be inflexible in a downward direction in chapter 14), will the firm want to lay off its trained workers?

In general, firms will not want to lay off their workers as long as the workers are bringing in revenues that are in excess of their wages. Even if the gap between marginal revenue productivity and wage is not sufficient to yield an attractive return on the firm's training investment, those training costs—once incurred—are "sunk." While the firm might wish it had not invested in training, the best it can do after training is get what returns it can. Workers who are laid off clearly bring in no returns to the employer, so its incentives are to retain any worker whose marginal revenue productivity exceeds his or her wage. Of course, if the downturn causes marginal revenue productivity to still fall below the wage rate, firms do have incentives to lay off trained workers (unless they believe the downturn will be very short and do not want to take the risk that the laid-off workers will search for other employment).

The presence of employer training investments, then, offers an explanation for two phenomena we observe in the labor market. *First, as a general rule, we observe that workers who are least susceptible to being laid off during recessions are the*

[26]David Blanchflower and Lisa Lynch, "Training at Work: A Comparison of U.S. and British Youths," in *Training and the Private Sector: International Comparisons*, ed. Lisa Lynch (Chicago: University of Chicago Press for the National Bureau of Economic Research, 1994): 233–260; Jonathan R. Veum, "Sources of Training and Their Impact on Wages," *Industrial and Labor Relations Review* 48 (July 1995): 812–826; Alan Krueger and Cecilia Rouse, "The Effect of Workplace Education on Earnings, Turnover, and Job Performance," *Journal of Labor Economics* 16 (January 1998): 61–94; and Judith K. Hellerstein and David Neumark," Are Earnings Profiles Steeper than Productivity Profiles? Evidence from Israeli Firm-Level Data," *Journal of Human Resources* 30 (Winter 1995): 89–112.

most skilled and those with the longest job tenures.[27] Older and more skilled workers are those most likely to have been the objects of past employer training investments, and they therefore tend to enter recessions with larger gaps between marginal revenue product and wage. These gaps cushion any fall in marginal revenue product and provide their employers with stronger incentives to keep on employing them during the downturn. Workers who enter the recession with wages closer to marginal revenue productivity are more likely to find that the downturn causes their marginal revenue product to fall below their wage, and when this occurs, employers may find it profitable to lay them off.

Second, we observe that average labor productivity—output per labor hour—falls in the early stages of a recession and rises during the early stages of recovery. As demand and output start to fall, firms that have invested in worker training respond by keeping their trained workers on the payroll even though their marginal productivity falls. Such "labor hoarding" causes output per worker to fall. Of course, when demand picks up again, firms can increase output without proportionately increasing their employment because, in effect, they have maintained an inventory of trained labor. In the latter situation, output per worker rises.

Hiring Investments

In addition to training employees, firms must also evaluate them when making hiring, placement, and promotion decisions. They may therefore find that training programs—even ones with a "general" component—can be used to help them discover the learning abilities, work habits, and motivation levels of new employees (see Example 5.3).[28] Thus, some of what appears to be general training may actually represent an investment in firm-specific information about employees that will be useful later on in making assignments and deciding on promotions. We conclude this chapter with a section that analyzes hiring and screening investments in greater detail.

The Use of Credentials

Since firms often bear the costs of hiring and training workers, it is in their interest to make these costs as low as possible. Other things equal, firms should prefer to obtain a workforce of a given quality at the least possible cost. Similarly, they should prefer to hire workers who are fast learners, because such workers could

[27]See Hilary Hoynes, "The Employment, Earnings and Income of Less Skilled Workers over the Business Cycle," in *Finding Jobs: Work and Welfare Reform*, eds. Rebecca Blank and David Card (New York: Russell Sage Foundation, 2000): 23–71.

[28]Margaret Stevens, "An Investment Model for the Supply of General Training by Employers." Also see W. R. Bowman and Stephen L. Mehay, "Graduate Education and Employee Performance: Evidence from Military Personnel," *Economics of Education Review* 18 (October 1999): 453–463.

EXAMPLE 5.3

Why Do Temporary-Help Firms Provide Free General Skills Training?

Temporary-help agencies employ about 3 percent of American workers. They hire workers who are, in effect, "rented out" to client firms, and they make their money by charging clients an hourly fee that exceeds what they pay their employees by 35 percent to 65 percent. Most provide their employees with nominally free training (temp workers are paid during training days), which is given "up front" with no requirement of continued employment. The training is general, focusing on word-processing and other computer skills. Training periods average only 11 hours, but the skills are clearly valuable—one leading company charges $150 per worker per day to provide similar training to its clients' nontemporary workers. Why do these temp agencies give valuable general training to workers who could take their new skills and run?

One economist explains this phenomenon by noting that providing training allows the temp agencies to find lower-paid workers who may lack certain skills but have an aptitude for, and place a value on, learning. The training allows temp agencies to screen such workers and learn about their abilities. How can these agencies capitalize on the information they generate about their trainees?

Many client firms use temp agencies to acquire information on applicants for permanent jobs without having to put much into the quasi-fixed costs of hiring and firing—and, of course, many temp workers are looking for permanent jobs. Indeed, about 15 percent of temporary-help workers are hired for permanent jobs by client firms each month. Temp agencies have thus become a means of providing and auditioning potential permanent workers to their clients, and they are paid primarily as information brokers. Client firms are willing to pay a premium for this information without themselves having to risk an investment, temp workers are willing to take a lower wage for the opportunity to audition for permanent work, and the audition period is long enough for temp agencies to recoup training costs because it takes some time for client firms to make their own evaluations.

Source: David Autor, "Why Do Temporary Help Firms Provide Free General Skills Training?" *Quarterly Journal of Economics* 116 (November 2001): 1409–1448.

be trained at less cost. Unfortunately, it may prove expensive for firms to extensively investigate the background of every individual who applies for a job to ascertain his or her skill level and ability to undertake training.

One way to reduce these costs is to rely on *credentials*, or *signals*, in the hiring process rather than intensively investigating the qualities of individual applicants.[29] For example, if, *on average*, college graduates are more productive than high school graduates, an employer might specify that a college degree is a requirement for the job. Rather than interviewing and testing all applicants to try to ascertain the productivity of each, the firm may simply select its new employees from the pool of applicants who meet this educational standard.

Such forms of *statistical discrimination*, judging individuals by *group* characteristics, have obvious costs. On the one hand, for example, some high school

[29]See Michael Spence, "Job Market Signaling," *Quarterly Journal of Economics* 87 (August 1973): 355–374. Refer to chapter 9 for a more detailed discussion of signaling.

EMPIRICAL STUDY

What Explains Wage Differences for Workers Who Appear Similar? Using Panel Data to Deal with Unobserved Heterogeneity

To test whether the law of one price holds in the labor market, we must test to see if workers who are productively equivalent receive different wages. If we try to use cross-sectional data at one point in time to perform our test, however, we run up against a huge problem: researchers cannot observe all the characteristics that affect worker productivity. For example, we cannot measure how willing a worker is to work overtime with little notice, how pleasant the worker is to customers or coworkers, or whether he or she is a "team player" or has a sunny personality. Without some way to account for worker differences in these characteristics that are important but not directly observed (what economists have come to call "unmeasured worker heterogeneity"), we cannot credibly test to see if the law of one price holds.

To better understand the problem, suppose that we estimate the average relationship between wages employees receive and their measured characteristics by using a sample of cross-section data. We can then use this relationship to derive an expected wage for a particular woman, say, given her age, education, occupation, and other observed qualities. If her actual wage exceeds her expected wage, we do not know if she is merely lucky (and the law of one price does not hold) or if she has unobserved qualities that employers value (and is therefore more productive than average, given her measured characteristics).

Fortunately, there is a way to deal with the problem of unobserved heterogeneity, but it requires undertaking the expense of gathering "panel data"—data that allow for observations on the same individual in two or more years. If we can follow individuals through time, we can analyze how their wages *change* as they move from job to job, employer to employer, or from one educational level to another. If the woman in our example who received a higher-than-expected wage with her first employer now changes jobs and receives an above-expected wage with the next, the likelihood is that she is an above-average producer and did not merely get lucky twice.

Thus, if we can follow individual workers through time, we can control for their unobserved personal productive characteristics ("person effects") by focusing on how the same person's wage varies when some measurable condition (education, occupation, or employer, for example) changes. To understand how the ability to control for person effects influences conclusions about how closely labor market outcomes correspond to predictions concerning the law of one price, consider

findings from a 1999 study using panel data from France.

When the relationships between wages and measured worker productive characteristics were analyzed in a cross-section of several million French workers, the researchers found that these measured characteristics could explain only about 30 percent of the variation in wages across the population. This finding seems to suggest that the predictions of the law of one price are badly off! Once person effects (in addition to the measured characteristics) were accounted for using panel data, however, the researchers were able to account for 77 percent of the variation in French wages. While there is still variation in wages that apparently cannot be explained by employee characteristics (observed and unobserved), the use of panel data permits a more valid test of the law of one price. The findings from using panel data suggest that there may be less variation due to luck than meets the eye.

Source: John M. Abowd, Francis Kramarz, and David N. Margolis, "High Wage Workers and High Wage Firms," *Econometrica* 67 (March 1999): 251–333.

graduates may be fully qualified to work for a firm that insists on college graduates. Excluding them from the pool of potential applicants imposes costs on them (they do not get the job); however, it also imposes costs on the employer *if* other qualified applicants cannot be readily found. On the other hand, there may be some unproductive workers among the group of college graduates, and an employer who hires them may well suffer losses while they are employed. However, if the reduction in hiring costs that arises when *signals* (such as educational credentials, marital status, or age) are used is large, it may prove profitable for an employer to use them even if an occasional unsatisfactory worker sneaks through.

Internal Labor Markets

One of the difficulties in hiring employees is that such personal attributes as dependability, motivation, honesty, and flexibility are difficult to judge from interviews, employment tests, or even the recommendations of former employers. This difficulty has led many larger firms to create an *internal labor market*, in which workers are hired into relatively low-level jobs and higher-level jobs are filled only from within the firm. This policy gives employers a chance to observe *actual* productive characteristics of the employees hired, and this information is then used to determine who stays with the firm and how fast and how high employees are promoted.

The *benefits* of using an internal labor market to fill vacancies are that the firm knows a lot about the people working for it. Hiring decisions for upper-level jobs in either the blue-collar or the white-collar workforces will thus offer few surprises to the firm. The *costs* of using the internal labor market are associated with the restriction of competition for the upper-level jobs to those in the firm. Those in the firm may not be the best employees available, but they are the only ones the

firm considers for these jobs. Firms most likely to decide that the benefits of using an internal labor market outweigh the costs are those whose upper-level workers must have a lot of firm-specific knowledge and training that can best be attained by on-the-job learning over the years.[30]

As noted earlier, firms that pay for *training* will want to ensure that they obtain employees who can learn quickly and will remain with them long enough for the training costs to be recouped through the post-training surplus. For these firms, the internal labor market offers two attractions. First, it allows the firm to observe workers on the job and thus make better decisions about which workers will be the recipients of later, perhaps very expensive, training. Second, the internal labor market tends to foster an attachment to the firm by its employees. They know that they have an inside track on upper-level vacancies because outsiders will not be considered. If they quit the firm, they would lose this privileged position. They are thus motivated to become long-term employees of the firm. The full implications of internal labor markets for wage policies within the firm will be discussed in chapter 11.

How Can the Employer Recoup Its Hiring Investments?

Whether a firm invests in training its workers or in selecting them, it will do so only if it believes it can generate an acceptable rate of return on its investment. For a labor investment to be worthwhile, an employer must be able to benefit from a situation in which workers are paid less than their marginal value to the firm in the post-investment period. How can employers generate a post-investment surplus from their *hiring* investments?

Suppose that applicants for a job vacancy have average, below-average, or above-average productivity but that the employer cannot tell which without making some kind of investment in acquiring that information. If the firm does not make this investment, it must assume that any particular applicant is of average ability and pay accordingly. If the firm makes an investment in acquiring information about its applicants, however, it could then hire *only* those whose productivity is above average. The surplus required to pay back its investment costs would then be created by paying these above-average workers a wage less than their true productivity.

Would the firm pay its new workers the average wage even though they are above average in productivity, thereby obtaining the full surplus? As with the case of training, the firm would probably decide to pay a wage greater than the average, but still below workers' actual productivity, to increase the likelihood that the workers in whom it has invested will remain. If its workers quit, the firm would have to invest in acquiring information about their replacements.

[30]For a detailed discussion of internal labor markets, see Paul Osterman, ed., *Internal Labor Markets* (Cambridge, Mass.: MIT Press, 1984); and George Baker and Bengt Holmstrom, "Internal Labor Markets: Too Many Theories, Too Few Facts," *American Economic Review* 85 (May 1995): 255–259.

While the self-interest of employers would drive them to pay an above-average wage to above-average workers, two things could allow the screening firm to pay a wage that is still lower than workers' full productivity. One is the presence of mobility costs among employees. The other is that information one employer finds out through a costly screening process may not be observable by other employers without an investment of their own. Either of these conditions would inhibit employees from obtaining wage offers from competing firms that could afford to pay full-productivity wages because they had no screening expenses to recoup.

Review Questions

1. How do worker-mobility costs affect the slope of labor supply curves to individual firms?
2. Why do upward-sloping labor supply curves to firms cause the marginal expense of labor to exceed the wage rate?
3. One recent magazine article on economic recovery from a recession argued: "Labor productivity growth usually accelerates in the first year of an expansion, because firms are slow to hire new labor." Comment.
4. "Minimum wage laws help low-wage workers because they simultaneously increase wages and reduce the marginal expense of labor." Analyze this statement.
5. An author recently asserted: "Low-wage jobs provide fewer hours of work than high-wage jobs." According to economic theory, is this statement likely to be correct? Why?
6. Workers in a certain job are trained by the company, and the company calculates that to recoup its investment costs, the workers' wages must be $5 per hour below their marginal productivity. Suppose that after training, wages are set at $5 below marginal productivity but that developments in the product market quickly (and permanently) reduce marginal productivity by $2 per hour. If the company does not believe it can lower wages or employee benefits, how will its employment level be affected in the short run? How will its employment level be affected in the long run? Explain, being sure to define what you mean by the short run and the long run!
7. For decades, most large employers bought group health insurance from insurers who charged them premiums on a *per-worker* basis. In 1993, a proposal for a national health insurance plan contained a provision requiring group health insurers to charge premiums based on *payroll* (in effect, financing health insurance by a payroll "tax"). Assuming the *total* premiums paid by employers remain the same, what are the labor market implications of this proposed change in the way in which health insurance is financed?
8. The manager of a major league baseball team argues: "Even if I thought Player X was washed up, I couldn't get rid of him. He's in the third year of a four-year, $24-million deal. Our team is in no position financially to eat the rest of his contract." Analyze the manager's reasoning by using economic theory.
9. The president of France has announced that his government is considering abandoning

its 2002 law that placed a cap on the hours that French employees could work each week (French workers were not allowed to work more than 35 hours per week). The reasons for eliminating the cap on weekly hours were listed as "unanticipated adverse consequences" in the areas of skill formation and employment levels. Use economic theory learned in this course to analyze the effects of the hours cap on skill formation and employment levels.

10. The State of North Carolina has a program for state-subsidized training of disadvantaged workers at its community colleges. Employers adding at least 12 jobs can arrange for a community college to provide a program tailored to the individual firm. The college places ads for new hires and screens the applicants, the firms choose whom they want trained from the list supplied by the college, and the college provides the training (using equipment supplied by the firm). Finally, the firm selects employees from among those who successfully complete the training. Trainees are not paid during the training period. Analyze the likely effects on wages, employment, and hours of work associated with adopting this program.

Problems

1. Suppose a firm's labor supply curve is $E = 5W$, where W is the hourly wage.
   a. Solve for the hourly wage that must be paid to attract a given number of workers (E) to the firm.
   b. Express the total hourly labor cost associated with any given level of employment.
   c. Express the marginal expense of labor (ME_L) incurred when hiring an additional worker.
2. Assume that the labor supply curve to a firm is the one given in Problem 1. If the firm's marginal revenue product (MRP_L) = $240 - 2E$, what is the profit-maximizing level of employment (E^*), and what is the wage level (W^*) the firm would have to pay to obtain E^* workers?
3. A firm is considering hiring a worker and providing the worker with general training. The training costs $1,000, and the worker's MRP_L during the training period is $3,000. If the worker can costlessly move to another employer in the post-training period and that employer will pay a wage equaling the new MRP_L how much will the training firm pay the worker in the training period?
4. As with the own-wage elasticity of demand for labor, the elasticity of supply of labor can be similarly classified. The elasticity of supply of labor is *elastic* if elasticity is greater than 1. It is *inelastic* if the elasticity is less than 1, and it is *unitary elastic* if the elasticity of supply equals 1. For each of the following occupations, calculate the elasticity of supply, and state whether the supply of labor is elastic, inelastic, or unitary elastic. E_S and W are the original supply of workers and wage. E_S' and W' are the new supply of workers and wage.
   a. $\%\Delta E_S = 7, \%\Delta W = 3$
   b. $E_S = 120, W = \$8$
      $E_S' = 90, W' = \$6$
   c. $E_S = 100, W = \$5$
      $E_S' = 120, W' = \$7$
5. The supply of labor is given in the following table for Teddy's Treats, a dog biscuit company, which is a profit-maximizing monopsonist.

Offered Wage ($)	Supply of Labor (Number of Hours)
4	18
5	19
6	20
7	21
8	22

a. Calculate the total labor cost and the marginal expense of labor for each level of employment.
b. Draw the supply of labor curve and the marginal expense of labor curve.

6. Teddy's Treats, the dog biscuit company in Problem 5, has the following MRP_L:

Number of Hours	MRP_L
18	29
19	27
20	25
21	23
22	21

a. Add the marginal revenue product curve to the drawing in Problem 5.
b. If Teddy's Treats is maximizing profits, how many hours of labor will be hired? What wage will be offered?

7. Suppose the workers at Teddy's Treats increase the number of hours they are willing to work at each wage rate. The new supply is:

Offered Wage ($)	Supply of Labor (Number of Hours)
4	19
5	20
6	21
7	22
8	23

a. Calculate the total labor cost and the marginal expense of labor associated with each employment level.
b. Draw the new supply and marginal expense curves.
c. Compare the supply of labor and marginal expense of labor curves with the corresponding curves in Problem 5. What changes occurred?
d. Assuming MRP_L is unchanged, how many hours of labor will now be hired? What wage will be offered?

8. Suppose the marginal expense of hiring another worker is $150, and the marginal expense of hiring current workers for an extra hour is $10. The added output associated with an added worker, holding both capital and average hours per worker constant, is 120. The added output generated by increasing average hours per worker, holding capital and the number of employees constant, is 7. If the firm is interested in maximizing profits, what should it do?

9. The following table gives the quantity of labor, the offered wage, and the MRP_L at Toasty Tasties, a restaurant that specializes in breakfast and lunch.

Quantity of Labor (Number of Hours)	Offered Wage ($)	MRP_L
5	6	–
6	8	50
7	10	38
8	12	26
9	14	14
10	16	2
11	18	1

a. Calculate the marginal expense of labor.
b. Draw the supply of labor, the marginal expense of labor, and the MRP_L curves at Toasty Tasties.

c. To maximize profits, how many hours of labor should be hired? What wage will the employer offer?
d. What would happen if some nonmarket force were to compel the firm to pay its employees $14 per hour?
e. What would happen if some nonmarket force were to compel the firm to pay its employees $26 per hour?
f. What would happen if some nonmarket force were to compel the firm to pay its employees an hourly wage that is larger than $26 per hour?

Selected Readings

Becker, Gary. *Human Capital*. 2nd ed. New York: National Bureau of Economic Research, 1975.

Hart, Robert. *Working Time and Employment*. London: Allen and Unwin, 1986.

Lynch, Lisa, ed. *Training and the Private Sector: International Comparisons*. Chicago: University of Chicago Press, 1994.

Manning, Alan, ed. "Modern Models of Monopsony in Labor Markets: Tests and Papers from a Conference Held in Sundance, Utah, November 2008, Organized by Orley Ashenfelter, Henry Farber, and Michael Ransom," *Journal of Labor Economics* 28 (April 2010): 203–472.

Manning, Alan. *Monopsony in Motion: Imperfect Competition in Labor Markets*. Princeton, N.J.: Princeton University Press, 2003.

Osterman, Paul, ed. *Internal Labor Markets*. Cambridge, Mass.: MIT Press, 1984.

Parsons, Donald. "The Firm's Decision to Train." In *Research in Labor Economics* 11, eds. Lauri J. Bassi and David L. Crawford, 53–75. Greenwich, Conn.: JAI Press, 1990.

Williamson, Oliver, et al. "Understanding the Employment Relation: The Analysis of Idiosyncratic Exchange." *Bell Journal of Economics* 16 (Spring 1975): 250–280.